



Rocky Flats, Colorado, Site Vegetation Management Plan

May 2006



U.S. Department
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Office of Legacy Management

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Vegetation Management Plan**

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1.0 Introduction

The vegetation management goal at the Rocky Flats Site (Site) is to exercise good stewardship for preservation of the natural resources while complying with applicable federal, state, and local regulations. The program incorporates an integrated ecosystem approach to natural resource management utilizing as many management techniques as possible. This Vegetation Management Plan utilizes an integrated framework of techniques to control excessive vegetation that can increase wildfire hazards, to control present and future infestations of noxious weeds, and to enhance the native plant communities and wildlife habitat.

Some vegetation management actions are regulated by law, but various levels of control are required depending upon the species to be controlled. Other vegetation management actions serve dual purposes of controlling the spread of invasive weeds and reducing the accumulation of fuels that can carry uncontrolled wildfires across the Site and into nearby areas. Invasions of non-native vegetation at the Site are degrading existing habitat quality in the undeveloped areas and reducing the coverage of the Site's high-value vegetation communities. The long-term suppression of wildfires, combined with the past prohibition of prescribed burning at the Site (including cessation of burning of accumulated vegetation debris out of fences), has allowed a heavy accumulation of fine fuels. This has increased the risk of uncontrolled wildfires.

By controlling excessive weed growth and mowing vegetation, fuel accumulation is reduced, and the sitewide noxious weed control effort enhanced. These vegetation control efforts also reduce the secondary seed source from noxious weeds that grow in disturbed areas of the Site.

Although no single weed control effort or strategy will completely remedy the noxious weed problems at the Site, this plan seeks to integrate various techniques to provide effective weed control and enhanced wildfire protection, while minimizing environmental damage and optimizing the use of available resources (Table 1). Some vegetation management actions are important from the standpoint of reduction of biomass that would otherwise provide fuel for wildfires; others are more important from a resource management perspective.

Table 1. Weed Control Methods for the Rocky Flats Site

Treatment Option	Control Method
Administrative Controls	Administrative policies and procedures
Cultural Controls	Revegetation requirements
Physical or Mechanical Controls	Mowing
	Prescribed Burns ^a
	Hand-pulling
Biological Controls	Insects
Chemical Controls	Herbicide application

^aPrescribed burns have been put on hold until the USFWS develops and implements their management plans for the refuge.

2.0 Weed Control Strategy

2.1 Weed Control Program

Vegetation management at the Site includes integration of the noxious weed control efforts with other means of vegetation control necessary for health and safety, resource conservation and wildfire control. Most noxious weeds invade ecosystems because of disturbance, degradation, or changes in the natural system that alter resource availability thus making the community more prone to invasions (Davis et al. 2000). Long-term control of these noxious weeds will ultimately depend on restoring the natural processes (i.e., fire, grazing) that originally kept the ecosystem healthy. However, weed control is a critical component of an integrated management approach because it focuses efforts directly on the undesired species.

2.1.1 Control Prioritization

2.1.1.1 Weed Ranking System for Weed Control Planning

In previous years, noxious weeds (legally listed as “state noxious weeds” by the State of Colorado) that are known to occur at the Site were prioritized for control. Ranking was conducted using the Alien Plants Ranking System (APRS; Version 5.0) developed by Ron Hiebert of the National Park Service and Jim Stubbendieck of the University of Nebraska.

A total of 30 species of Colorado state listed noxious weeds are known to occur or have historically occurred at the Site (Table 2). However, not all species are slated for control. Many of the state listed species are only found at isolated disturbed locations and are not presently having an impact on the native plant communities at the Site. Many of these species are also not aggressive, invasive species (under current conditions at the Site) and are therefore not high priority species for control at this point in time.

At the Site, the species with the greatest potential to impact the native plant communities and greatest difficulty of control are annual rye, Canada thistle, dalmatian toadflax, diffuse knapweed, Russian knapweed, Scotch thistle, and yellow starthistle (Note: list is in alphabetical order). The aggressive nature, and ability of these species to dominate and degrade the native plant communities, makes control of these species especially important.

Diffuse knapweed, Canada thistle, and dalmatian toadflax are all widespread at the Site. Herbicide applications have been made and biocontrol insects have been released for all three species. The abundance of diffuse knapweed has decreased considerably on the pediment tops at the Site through the past herbicide applications made with a helicopter (1999–2002). Both Transline[®] and Tordon22K[®] have been used. Tordon22K[®] has given approximately 4 years of control at many locations. However, studies at the Site have shown there are also impacts to the native forb species with Tordon22K[®]. The native forb community takes approximately 7 years to return to pre-treatment levels after an application of Tordon22K[®] (application rate = 1 pint/acre). In the drainages, however, treatment of diffuse knapweed with large scale herbicide applications have not been possible because these areas are located in Preble’s mouse habitat (a federally listed threatened species) and permission from the U.S. Fish and Wildlife Service (USFWS) has not been obtained that will allow weed control of any significance in the mouse habitat. So instead, several releases of diffuse knapweed biocontrol insects have been made at locations

where herbicide applications are not possible. Large numbers of biocontrol insects have been released since 2001 and some reduction in seed production of diffuse knapweed plants has been observed at the release locations. The goal is to allow the insects to continue to expand across the Site and achieve levels of control similar to what has been seen on Boulder County Open Space to the north of the Site. As a result, continued large scale herbicide applications for diffuse knapweed are not planned in order to give the insects the opportunity to continue to build their populations. Some small scale herbicide applications at selected locations may be made where biocontrols do not seem to be establishing.

Table 2. Noxious Weeds Occurring at the Rocky Flats Site

+Annual Rye (<i>Secale cereale</i>)	+Lens-padded hoary cress (<i>Cardaria chalapensis</i>)
+Bird's-foot trefoil (<i>Lotus corniculatus</i>)	*Mayweed chamomile (<i>Anthemis cotula</i>)
*Bouncing bet (<i>Saponaria officinalis</i>)	*Moth mullein (<i>Verbascum blattaria</i>)
*Bull thistle (<i>Cirsium vulgare</i>)	*Musk thistle (<i>Carduus nutans</i>)
*Canada thistle (<i>Cirsium arvense</i>)	*Oxeye daisy (<i>Chrysanthemum leucanthemum</i>)
*Chicory (<i>Cichorium intybus</i>)	*Perennial Sowthistle (<i>Sonchus arvensis</i>)
*Common burdock (<i>Arctium minus</i>)	*Poison Hemlock (<i>Conium maculatum</i>)
*Common mullein (<i>Verbascum thapsus</i>)	*Puncturevine (<i>Tribulus terrestris</i>)
*Common St. Johnswort (<i>Hypericum perforatum</i>)	*Quackgrass (<i>Elytrigia repens</i>)
+Crown vetch (<i>Coronilla varia</i>)	*Redstem Filaree (<i>Erodium cicutarium</i>)
*Dalmatian toadflax (<i>Linaria dalmatica</i>)	*Russian knapweed (<i>Centaurea repens</i>)
*Dame's rocket (<i>Hesperis matronalis</i>)	*Russian olive (<i>Elaeagnus angustifolia</i>)
*Diffuse knapweed (<i>Centaurea diffusa</i>)	*Saltcedar (<i>Tamarix ramosissima</i>)
*Downy brome (<i>Bromus tectorum</i>)	*Scotch thistle (<i>Onopordum acanthium</i>)
*Field bindweed (<i>Convolvulus arvensis</i>)	+Texas blueweed (<i>Helianthus ciliaris</i>)
*Hoary cress (<i>Cardaria draba</i>)	**Yellow starthistle (<i>Centaurea solstitialis</i>)
*Houndstongue (<i>Cynoglossum officinale</i>)	*Yellow toadflax (<i>Linaria vulgaris</i>)
*Jointed goatgrass (<i>Aegilops cylindrica</i>)	

*Noxious weeds as listed by the State of Colorado Noxious Weed Act (2005). Rules updated in 2005 (8CCR 1203-19).

**Species listed on Colorado's "A List" (eradication mandated by law). This species was discovered and eradicated from the Site in 2003.

+Additional species considered a problematic weed at the Site.

Plant nomenclature follows that of GPFA (1986), Weber (1976), and Weber (1990), in that order of determination.

Past herbicide applications of Tordon22K[®] (1 pint/acre) have had some reduction effect on the flowering and abundance of dalmatian toadflax at some locations. This was observed at some high density locations of dalmatian toadflax after the helicopter spraying in 2000. At some locations, densities still remain reduced, while at other locations the densities have returned or never really changed from pre-treatment levels. Higher application rates of Tordon22K[®] have been suggested as potentially having a greater effect at controlling dalmatian toadflax. Of course, with higher rates there will be greater impacts to the native forb community also. So it is a balancing act between trying to control the noxious weed species while retaining the biodiversity of the grasslands that make Rocky Flats such a unique area ecologically. At selected locations in spring 2004, Tordon22K[®] was applied for dalmatian toadflax control at an application rate of 1 quart/acre in order to evaluate the effectiveness of this control effort. In spring 2005, an application of Tordon22K[®] (application rate 1 quart/acre) plus Telar[®] (application rate 1 ounce/acre) was applied to areas of high toadflax abundance. The latter application was based on discussions with Boulder County weed control personnel. The challenge with the toadflax is compounded by the fact that it seems to now be slowly increasing in the locations where diffuse knapweed has previously been very abundant. The challenge however, is that if we want to let

the biocontrol insects take control of the diffuse knapweed, we cannot continue to spray these areas to get rid of the toadflax, because we just decrease the effectiveness of the diffuse knapweed biocontrols. So the control efforts of the two species seem almost in opposition to each other. Two different biocontrols have been released to help control dalmatian toadflax at the Site. Only one of the biocontrol insects has established and initial indications are that at some locations it is having an effect. Dalmatian toadflax control continues to remain a challenge.

Biocontrol insects released for Canada thistle have begun to show signs of establishment at some locations at the Site. This is promising because the species is common in wetland areas and control with herbicides is more difficult. A mowing and spraying effort was begun on Canada thistle in 2003 at an upland area to determine the effectiveness of this treatment. Observations in 2004 and 2005 showed some reduction of Canada thistle in the mowed/sprayed area compared to adjacent untreated locations. Further examination of this combination of treatments may be explored.

Russian knapweed occurs at one small location at the Site and has been kept from expanding by controlling it with herbicides the past few years. Applications of Telar[®], Tordon22K[®], and Roundup[®] over the past 4 years have contained the population and reduced the population, but it still holds on. Roundup[®] has been the most effective treatment on the species. Eradication is the long-term goal for this species at the Site and reseeding of the area with native species to return the area to a native grassland. Russian knapweed seed has a seed bank lifespan of 2 to 8 years, so long term monitoring of this area will be required to prevent a re-infestation of this species.

Annual rye, although not a state listed noxious weed, is of concern at the Site because it has become established at several locations along roadsides and has begun to invade the surrounding native prairie. Mowing has been conducted for the past few years to try and prevent seed set, but because of problems in getting the mowing crews to the locations at the proper time and because the mower height must be set so high due to the rocky nature of the roadsides, little success has been achieved. Because the species is an annual plant, preventing seed set is a key factor to its control. Studies have shown that after 14 months, less than 1 percent of the seed remains viable (Stump and Westra 1993). Current efforts will use Roundup[®] along the roadsides in the early spring prior to flowering followed by reseeding of the roadsides with native species. However, long-term monitoring will need to be maintained at these locations to control additional annual rye plants that germinate from the seed bank.

Control of several small populations of Scotch thistle have been successful using hand control and spot herbicide applications with Roundup[®]. Additional isolated populations continue to be found throughout the Site, presumably as a result of the movement of seed by animals and/or wind. Monitoring of these locations will continue to be conducted and weed control applied as necessary.

Jointed goatgrass is becoming a more significant problem along the roadsides at the Site. Initially spread around the roads at the Site by firebreak grading operations, the species has now begun to spread into the surrounding native grasslands. The use of Roundup[®] has proven effective for controlling jointed goatgrass along roadside edges. During 2005, Plateau[®] was used on a patch of jointed goatgrass that had invaded the native grasslands. Further evaluation of this infestation is necessary to determine the effectiveness of this treatment on the native grassland areas where total kill of all species is not desirable.

Yellow starthistle, while a potentially huge problem species, was eradicated from the Site in 2003 at Building 123. Annual inspections of the Building 123 area will need to be continued in future years to determine if new plants become established from the seed bank. Additional locations that received topsoil during the same timeframe included, Building 111 and Building 333. In general, all the revegetation locations at the Site will be monitored for noxious weeds and where necessary, appropriate weed control measures taken.

Table 3 lists the potential control methods for the noxious and problematic weed species at the Site. Noxious or problematic weed species may be added to the lists maintained under this program at any time, depending upon the adoption of noxious weed list revisions by state or local regulatory agencies.

3.0 Vegetation Management

Table 1 lists the weed and vegetation control methods currently in use at the Site. The weed control measures in this section are listed in the order they should be considered from and integrated weed management viewpoint, starting with the least toxic, non-chemical measures.

3.1 Administrative and Cultural Weed Management Actions

Administrative and cultural weed management actions are incorporated into this plan with the intention of preventing the introduction and spread of weeds at the Site. As decommissioning and demolition of buildings in the IA occurred, a large amount of area was subject to disturbance and subsequent revegetation. These areas must be protected from invasive weeds and properly treated to encourage successful establishment of native vegetation cover. The preventative actions incorporated into this Vegetation Management Plan are listed in Table 4.

Revegetated areas will be monitored to evaluate the success of the revegetation and used to determine if future management actions are needed. When warranted, weed control and/or reseeded of these areas will be conducted to establish the desired native plant species.

The following graminoid species shall not be used in seed mixtures for revegetation projects on Site:

- Annual rye grass *Secale cereale*
- Bulbous bluegrass *Poa bulbosa*
- Crested wheatgrass *Agropyron desertorum* or *Agropyron cristatum*
- Intermediate wheatgrass *Agropyron intermedium*
- Johnsongrass *Sorghum halepense*
- Orchardgrass *Dactylis glomerata*
- Quackgrass *Agropyron repens*
- Sheep fescue *Festuca ovina*
- Smooth brome *Bromus inermis*
- Timothy *Phleum pratense*
- Wild proso millet *Panicum milaceum*

Table 3. Target Weeds At the Rocky Flats Site and Potential Control Methods

Target Pest	Control Method			
	Mechanical	Biocontrol	Chemical Use	
Common Name (Scientific Name)			Chemical	Application Method
Annual Rye (<i>Secale cereale</i>)	Mowing		Roundup	Backpack/Broadcast
Bird's-foot trefoil (<i>Lotus corniculatus</i>)			Roundup	Backpack/Broadcast
			Transline	
Bouncing bet (<i>Saponaria officinalis</i>)	Weed Whack		Roundup	Backpack/Wick
			Rodeo	
Bull thistle (<i>Cirsium vulgare</i>)	Weed Whack	Yes	Rodeo	Backpack/Wick
Canada thistle (<i>Cirsium arvense</i>)	Mowing/Weed Whack	Yes	Roundup	Backpack/Wick
			Transline	Broadcast/Backpack (only if mowed first)
			Tordon 22K	
Chicory (<i>Cichorium intybus</i>)				
Common burdock (<i>Arctium minus</i>)				
Common mullein (<i>Verbascum thapsus</i>)	Mowing		Tordon 22K	Broadcast
Common St. Johnswort (<i>Hypericum perforatum</i>)	Weed Whack	Yes	Roundup	Backpack
Crown vetch (<i>Coronilla varia</i>)			Roundup	Backpack/Wick
Dalmatian toadflax (<i>Linaria dalmatica</i>)		Yes	Tordon 22K	Broadcast
			Tordon 22K+Telar	
			Plateau	
Dame's rocket (<i>Hesperis matronalis</i>)			Roundup	Backpack/Wick
			Rodeo	
Diffuse knapweed (<i>Centaurea diffusa</i>)	Mowing	Yes	Tordon 22K	Broadcast
			Transline	
Downy brome (<i>Bromus tectorum</i>)				
Field bindweed (<i>Convolvulus arvensis</i>)		Yes		
Hoary cress (<i>Cardaria draba</i>)				
Houndstongue (<i>Cynoglossum officinale</i>)				
Jointed goatgrass (<i>Aegilops cylindrica</i>)			Roundup	Broadcast
			Plateau	

Table 3 (continued). Target Weeds At the Rocky Flats Site and Potential Control Methods

Target Pest Common Name (Scientific Name)	Control Method			
	Mechanical	Biocontrol	Chemical	Chemical Use Application Method
Lens-padded hoary cress (<i>Cardaria chalapensis</i>)				
Mayweed chamomile (<i>Anthemis cotula</i>)				
Moth mullein (<i>Verbascum blattaria</i>)				
Musk thistle (<i>Carduus nutans</i>)	Mowing	Yes	Transline Tordon 22K	Broadcast
Oxeye daisy (<i>Chrysanthemum leucanthemum</i>)				
Perennial Sowthistle (<i>Sonchus arvensis</i>)				
Poison hemlock (<i>Conium maculatum</i>)				
Puncturevine (<i>Tribulus terrestris</i>)				
Quackgrass (<i>Elytrigia repens</i>)				
Redstem Filaree (<i>Erodium cicutarium</i>)				
Russian knapweed (<i>Centaurea repens</i>)	Mowing		Tordon22K Telar Roundup	Broadcast
Russian olive (<i>Elaeagnus angustifolia</i>)	Cutting/Removal		Roundup	Backpack
Saltcedar (<i>Tamarix ramosissima</i>)	Cutting/Removal		Roundup	Backpack
Scotch thistle (<i>Onopordum acanthium</i>)	Weed Whack/Hand Pull		Roundup Tordon 22K	Backpack/Wick Broadcast
Texas blueweed (<i>Helianthus ciliaris</i>)			Roundup	Backpack/Wick
Yellow starthistle (<i>Centaurea solstitialis</i>)	Hand Pull		Roundup Tordon22K	Backpack Broadcast
Yellow toadflax (<i>Linaria vulgaris</i>)			Roundup Tordon 22K	Backpack/Wick Broadcast
Shaded species currently have no specific control methods applied. They may however, be indirectly controlled as part of control activities for other species				

Table 4. Preventative Actions for Weed Control

Weed-free Materials	All revegetation projects at the Site will use weed-free seed and mulch sources. Seed mixes will be composed of appropriate native species for the locations.
Approved Seed Mixtures Only	All seed mixtures for Site revegetation projects must be approved by the Stoller Environmental Services (ES) Group. All seed mixtures to be used on Site will be inspected, prior to planting (as feasible), by a qualified ecologist to ensure that the proper seed mixture was obtained. Use of native species will be required in all cases, except when specific written prior approval has been obtained from the ES Group.
Sterile Mulch	All straw used for mulch on the Site will be weed-free.
Followup Weed Control	Weed control and reseeding should be a part of all revegetation efforts for a minimum of 2 years after their initiation (i.e., 3 years in total).
Immediate Eradication of New Species	Any new noxious weed species found on the Site will be controlled immediately to reduce their population and prevent their future increase.

3.2 Mowing

Some areas along Site roads may be mowed to keep the weeds cut back. There are several purposes for mowing roadsides. Properly timed mowing can stress weeds and impact seed-set of these undesirable plants, which aids in the control of noxious weeds. For practical travel safety reasons, keeping roadside vegetation cut low in some areas is also needed. Mowing road edges increases visibility of wildlife crossing the roads and can help reduce collisions between wildlife and cars, as well as provide better visibility at intersections. Reduction of roadside vegetation height also reduces the available fuel at the margins of the firebreak and paved roads, functionally enhancing their ability to impede the spread of wildfires, and aiding firefighters in extinguishing fires in these lower-fuel buffer areas.

In addition to the fuel reduction actions already discussed, weeds and debris that have accumulated in fences will be removed as needed. This removal may include physical removal or prescribed burning of such debris out of fences in situ. Fuel reduction shall occur as needed. Vegetation debris *shall not* be tossed loose, or disposed of *anywhere* except in appropriate waste containers destined for offsite landfill disposal. Prescribed burns, if again allowed on Site, will require an approved prescribed burn plan and conform to policies outlined in DOE Order 450.1.

3.2.1 Prescribed Burning and Grazing

The use of prescribed burns and grazing on Site grasslands is highly recommended as a management tool to help control weeds, reduce plant litter, recycle nutrients, and improve the health and vigor of the native plant communities. Weed control strategies that focus solely on the weed species and not on enhancing conditions for desired native species will provide only limited success. If desired native species are not able to fill in the openings created in the native plant communities after target weed species are eliminated, then often other undesirable weeds will come in and take their place. The tools available for resource management at the Site are currently limited by Site policies. This is especially true with regard to grassland resource management where the natural processes of grazing and fire are essential for prairie health. Currently, grazing is not permitted at the Site and prescribed burns have been suspended until USFWS takes over management of the Rocky Flats National Wildlife Refuge.

3.2.2 Biological Weed Controls (Insects)

Biological control agents (i.e., insects) are being used on the Site to assist in the control of musk thistle, bull thistle, St. John’s-wort, dalmatian toadflax, Canada thistle, field bindweed, and diffuse knapweed. The insects have been provided to the Site by the Colorado Department of Agriculture (CDA), and USFWS through an agreement with Texas A&M University, to target specific weed infestations. [Table 5](#) lists the biological controls that have been released at the Site.

Table 5. Biological Control Agents Released at the Rocky Flats Site

Target Species	Beneficial Organism	Effect
Diffuse knapweed (<i>Centaurea diffusa</i>)	<i>Urophora quadrifasciata</i>	Attacks knapweed flowers, producing galls that reduce seed production.
	<i>Urophora affinis</i>	Attacks knapweed flowers, producing galls that reduce seed production.
	<i>Sphenoptera jugoslavica</i>	Beetle larvae bore into root crown and upper roots of knapweed, retarding plant development and stunting growth.
	<i>Larinus minutus</i>	A seedhead weevil.
	<i>Cyphocleonus achates</i>	A root boring weevil.
Musk thistle (<i>Carduus nutans</i>)	<i>Rhinocyllus conicus</i>	A weevil that eats the seeds in the musk flower heads.
	<i>Trichosirocalus horridus</i>	Weevil that attacks the crown of musk thistle, thus killing the apical meristem and reducing the potential of the plant to flower.
Bull thistle (<i>Cirsium vulgare</i>)	<i>Urophora sylata</i>	Attacks flower heads and reduces seed set.
Canada thistle (<i>Cirsium arvense</i>)	<i>Urophora carduii</i>	A gall fly.
	<i>Cassida rubiginosa</i>	A defoliating beetle.
St. Johns-wort (<i>Hypericum perforatum</i>)	<i>Chrysolina quadrigemina</i>	A foliage-feeding beetle.
Dalmatian toadflax (<i>Linaria dalmatica</i>)	<i>Calophasia lunula</i>	Larvae of this moth feed on the leaves and flowers of the plant.
	<i>Mecinus janthinus</i>	A stem mining beetle.
Field Bindweed (<i>Convolvulus arvensis</i>)	<i>Aceria malherbae</i>	A gall mite.

It is recommended that cooperative efforts with these groups continue with regard to the release of biological control agents for weed control at the Site. Additional releases of insects and other biological control agents for the above-listed and other species could increase the effectiveness of the weed control efforts while potentially reducing costs. Communication with local researchers who are evaluating the use of biocontrols on nearby Open Space properties will be continued to keep abreast of any new findings and techniques.

3.2.3 Chemical Weed Controls

[Table 6](#) lists the herbicides approved for use on the Site. Herbicides *not* on the current list *may not* be used until they are approved. Many of these chemicals are restricted-use herbicides and must be applied only by a licensed (certified) applicator. Such restricted-use herbicides may not be applied onsite by unlicensed applicators. Unrestricted-use herbicides, such as Roundup, may be applied by unlicensed applicators, following label instructions. Empty containers may not be

washed onsite, and used containers must be removed by the applicator at the end of the work shift. Disposal of restricted-use herbicides is strictly the responsibility of the applicator. The selected herbicides and application rates are based on the best available information, herbicide labels, and recommendations from experts (Beck 1992, 1996a, 1996b, 1997a, 1997b, CNAP 2000).

Table 6. Approved Herbicides for Use at the Rocky Flats Site (Last updated 3/15/06)

<u>Herbicide Name</u>	<u>Active Ingredient</u>
Aquatic 2 4D	2 4 Dichlorophenoxyacetic Acid
Arsenal	Imazapyr
Banvel	Dicamba
Barricade	Prodiamine
Buctril	Bromoxynil
Escort	Metsulfuron
Gallery	Isoxaben
Garlon 3A	Triclopyr
Habitat	Imazapyr
Karmex	Diuron
Milestone	Aminopyralid
Navigate	2 4 Dichlorophenoxyacetic Acid
Oust	Sulfometuron
Plateau	Imazapic
Redeem	Chlopyrilid + Trichlopyr amine
Rodeo	Glyphosphate
Roundup	Glyphosphate
Sahara	Diuron; Imazapyr
Surflan	Oryzalin
Telar	Chlorsulfuron
Transline	Clopyralid
Tordon 22K	Picloram
Vanquish	Diglycolamine

Chemical controls have been used effectively in the past at the Site to control various noxious weed species. Proposed applications will be developed on the basis of noxious weed mapping results.

3.3 Vegetation Management and the Preble's Mouse

The Preble's meadow jumping mouse (*Zapus hudsonius preblei*) is a listed threatened species under the Endangered Species Act. A Biological Assessment and corresponding Biological Opinion for the Rock Creek Reserve allows up to 3 acres of weed control within current Preble's protection areas within the Rock Creek Reserve on an annual basis (USFWS 2001a, 2001b). For the purposes of this plan, the 3 acres allowed within current Preble's protection areas only applies to off-road applications. Herbicide applications and weed control efforts along already disturbed roadsides, which do not constitute Preble's habitat, are not included in the 3 acre allotment.

Weed management in Preble's habitat outside of Rock Creek will consist of biological control insect releases and weed management required by the USFWS for project mitigation areas. Weed

management in project mitigation areas are required to meet success criteria set by the USFWS. At this time, no other weed management activities are planned in Preble's habitat outside of the Rock Creek drainage at the Site.

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